



Energy Roadmap 2050

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Energy

● The Energy Roadmap 2050 as a basis for developing a long-term policy framework

Supported by scenario analyses

European Council

- EU objective for 2050 – GHG emissions down to 80-95% below 1990 levels
- Looks forward to elaboration of a low-carbon 2050 strategy – a framework for longer-term action in energy and related sectors

Aim of the Roadmap

- Give more certainty to governments and investors
- Explore routes towards a low-carbon energy system by 2050 which improve competitiveness and security of supply
- Basis for developing the 2030 policy framework and concrete milestones with MS, EP and stakeholders

● Scenarios explore routes to decarbonisation of energy system

Current trends scenarios

- Reference scenario (as of March 2010)
 - Current Policy Initiatives (as of April 2011)
- ➔ 40% GHG reduction by 2050

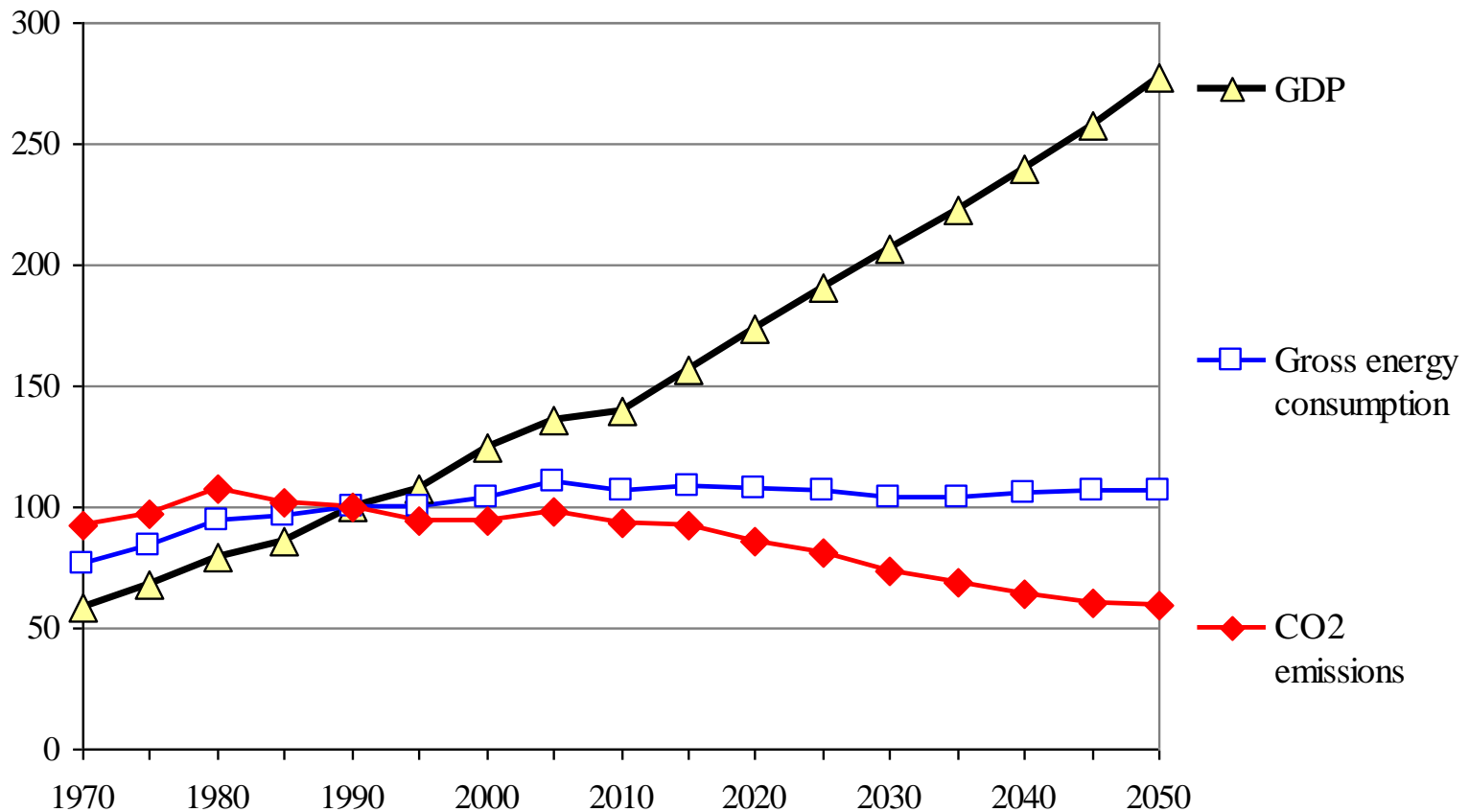
Decarbonisation scenarios

- High Energy Efficiency
 - Diversified Supply Technologies
 - High RES
 - Delayed CCS
 - Low Nuclear
- ➔ 80% GHG reduction



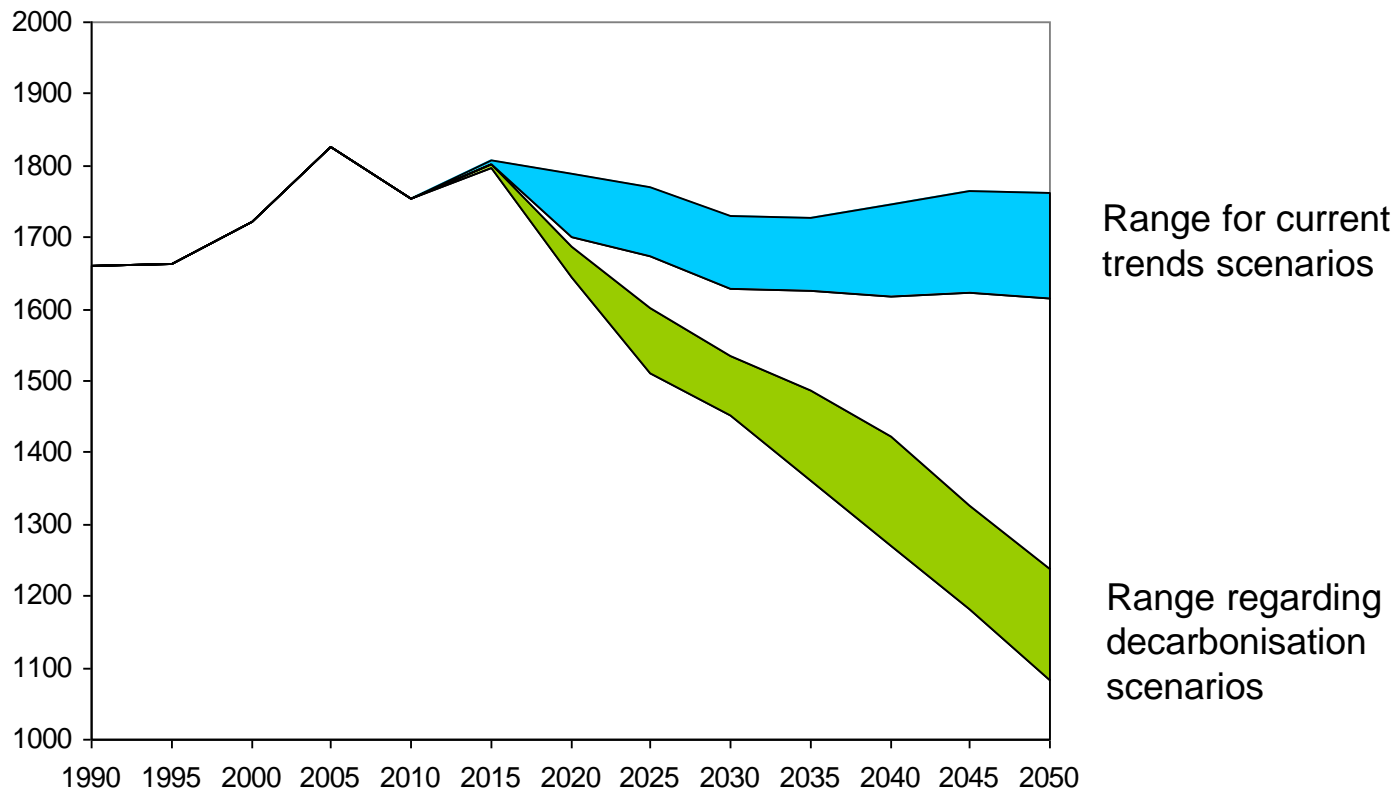
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EU-27: Reference scenario: GDP, energy consumption and CO2 emissions 40 years back and ahead (1990 = 100)



Energy savings throughout the system are crucial

Gross energy consumption - range in current trend (REF/CPI) and decarbonisation scenarios (in Mtoe)

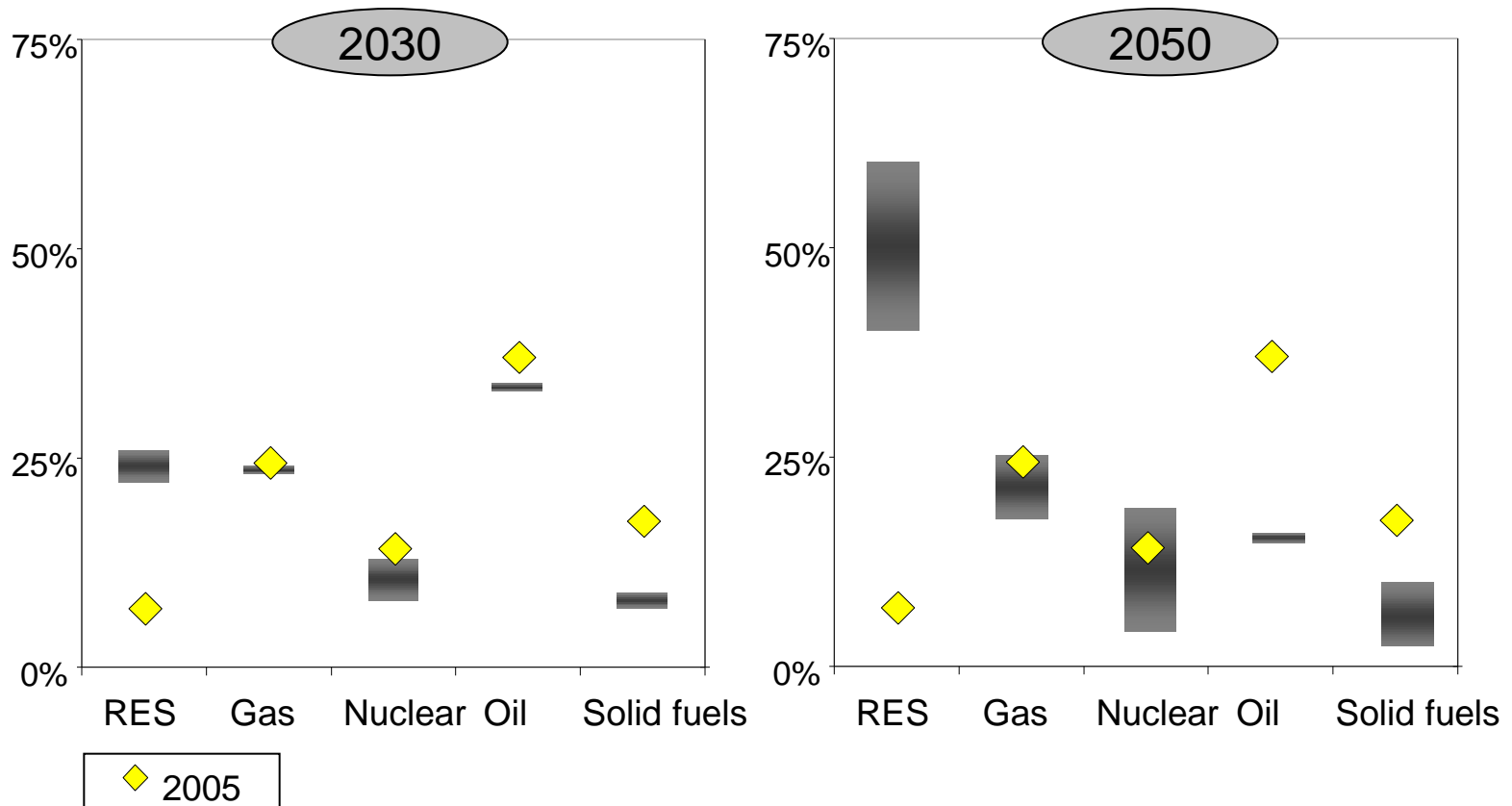




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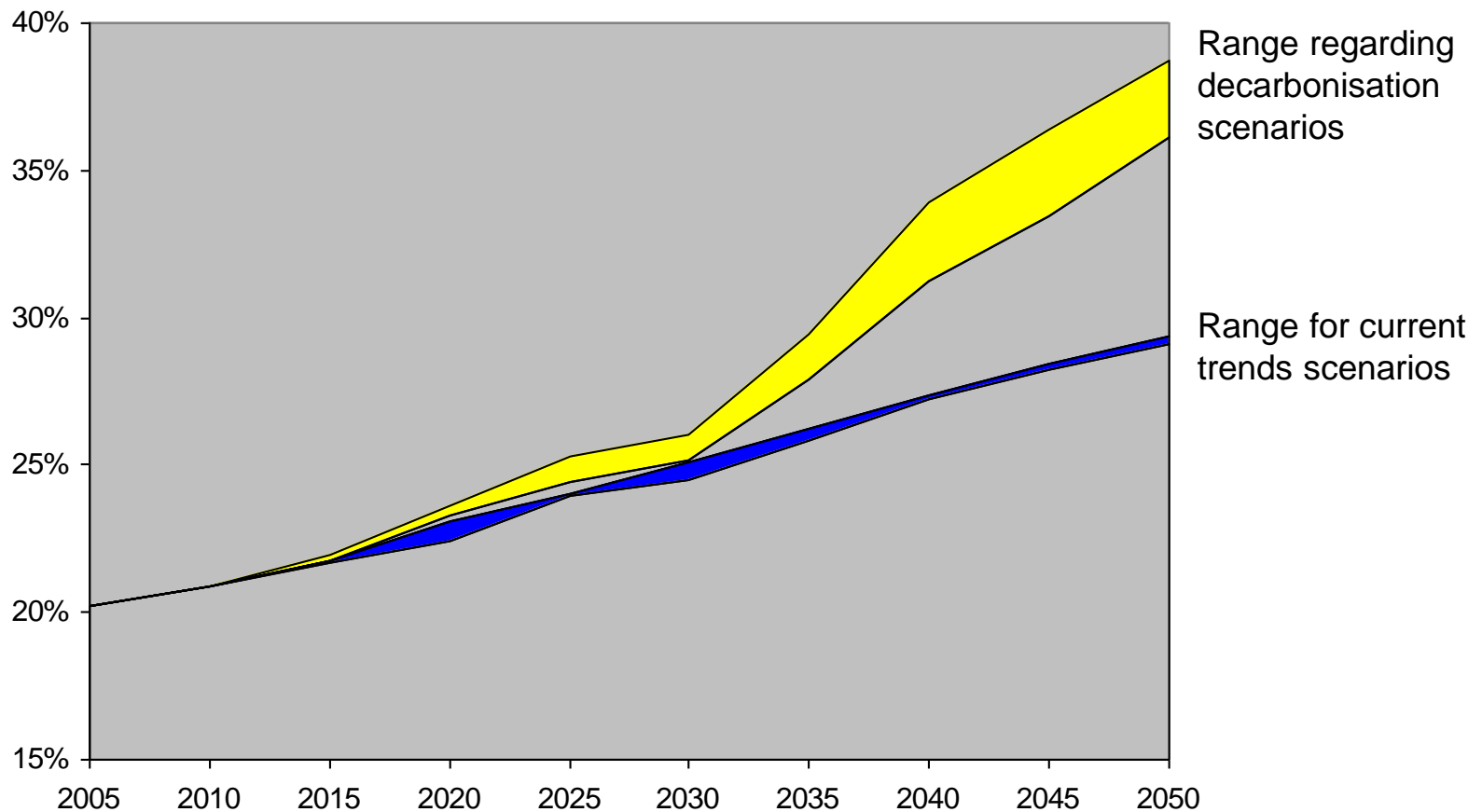
Renewables move centre stage – but all fuels can contribute in the long-run

Decarbonisation scenarios - fuel ranges (primary energy consumption in %)



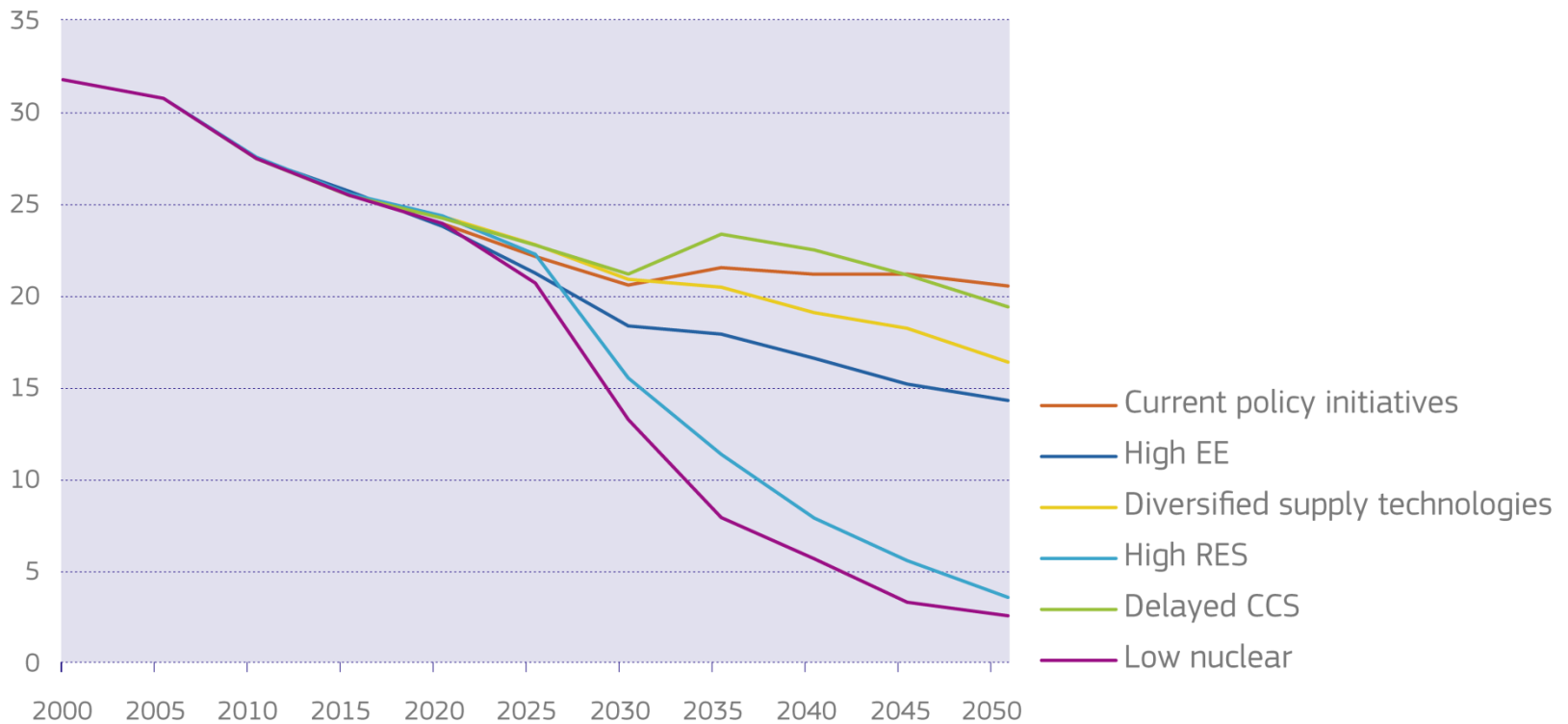
● Electricity plays an increasing role

Share of electricity in current trend and decarbonisation scenarios
(in % of final energy demand)



● Role of nuclear energy depends on scenario

Share of nuclear in power generation (in %)

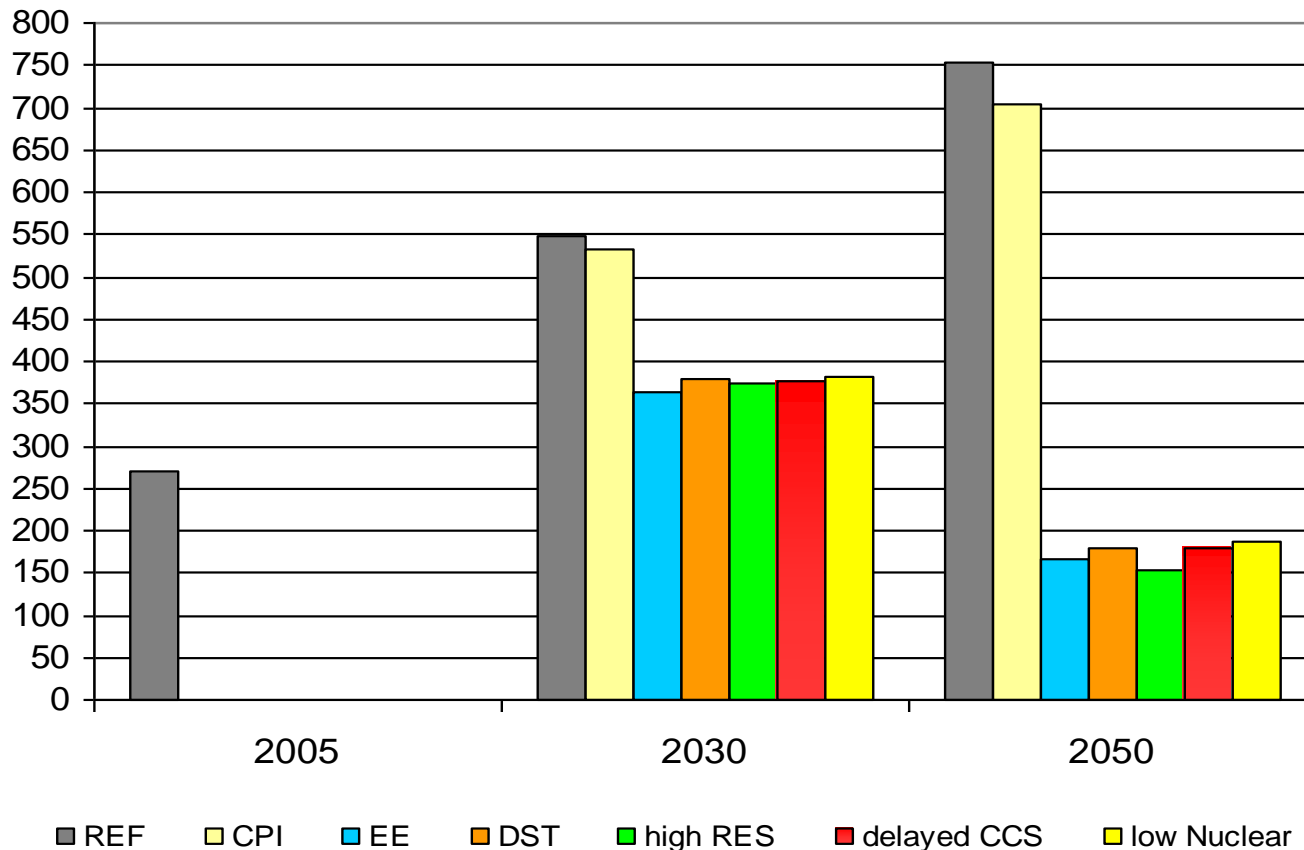


Nuclear production will contribute more or less, depending on the scenario.
80% GHG reduction can also be achieved with a very low nuclear contribution.

Roadmap 2050 – Role of Nuclear Energy

GHG reduction target in 2050	Energy RM 2050 Scenarii	Nuclear in electricity generation in % in 2050 [eq. capacity operating in GWe vs 125 GWe today]	
40%	Reference Scenario	26,4%	[161 GWe]
40%	Current Policy Initiatives	20,6%	[117 GWe]
80%	High Energy Efficiency	14,2%	[79 GWe]
80%	Diversified supply technologies	16,1%	[102 GWe]
80%	High Renewables	3,6%	[41 GWe]
80%	Delayed CCS	19,2%	[127 GWe]
80%	Low Nuclear	2,5%	[16 GWe]

● EU: External Fossil Fuel Bill (in bn € of 2008)



Decarbonisation brings substantial fuel bill savings in 2050 with respect to 2005 and Reference/CPI

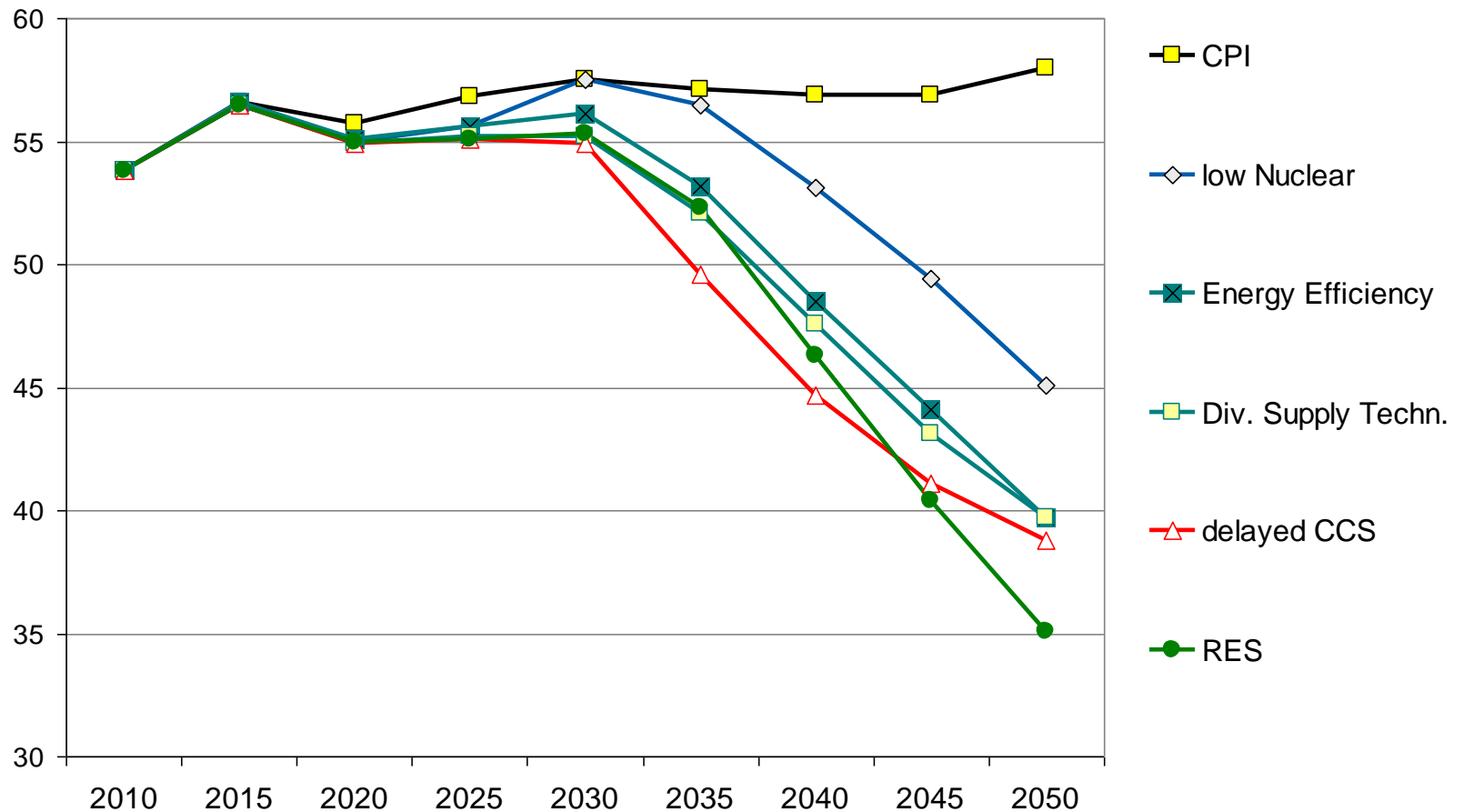
Compared with CPI the EU economy could save between 518 and 550 bn € in 2050 through decarbonisation under global climate action

Savings are largest in the high RES scenario



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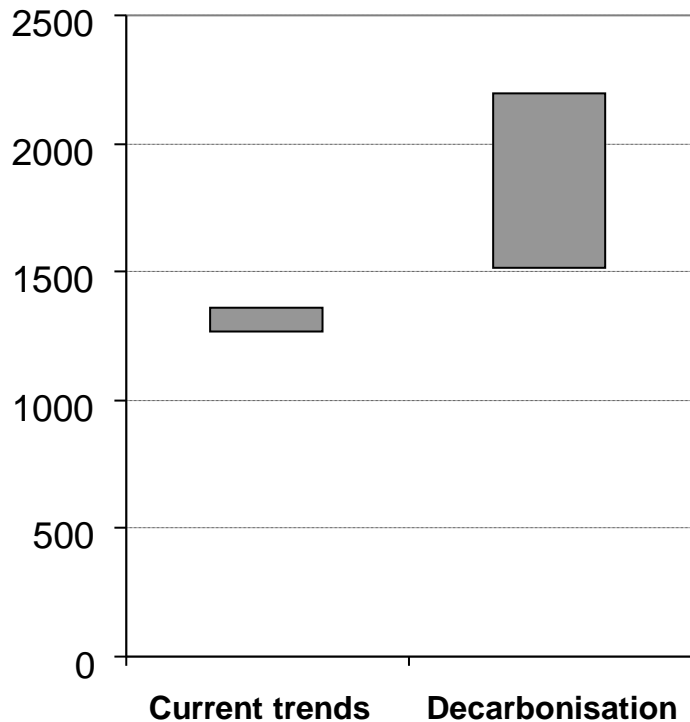
● Import dependency under current trends and decarbonisation (%)



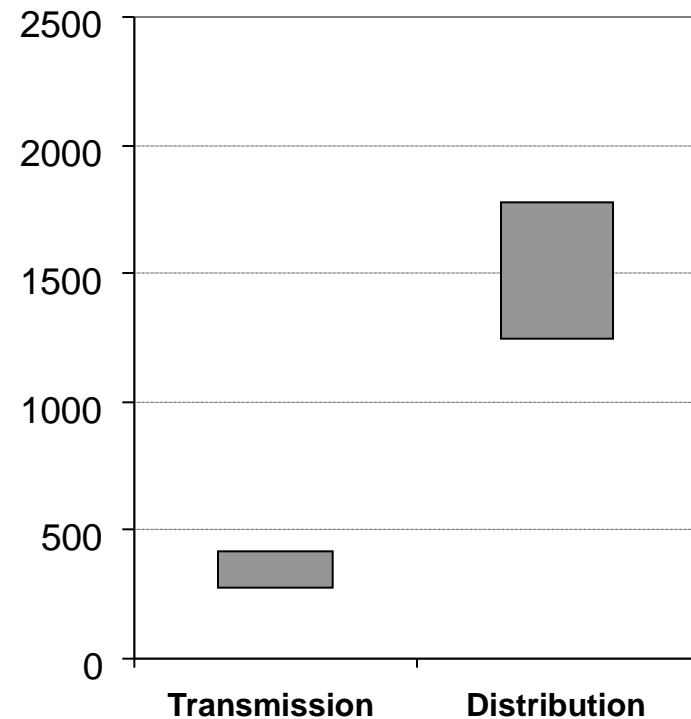
● Grid investment costs increase

Cumulative costs 2011-2050 in bn € (in ranges)

Grid investment (current trends and decarbonisation)



Transmission and distribution in decarbonisation scenarios



● The Way Forward

- 2020 strategy – precondition
- No regret options: energy efficiency, renewable energy, more and smarter infrastructure
- Need for fully integrated, well-designed markets for gas and electricity
- Innovation for low-carbon solutions
- Nuclear safety
- Broader and coordinated approach

⇒ **(1) Develop milestones for 2030 in an iterative process with Member States, European Parliament, stakeholders**

⇒ **(2) Launch a dialogue on the development of future energy systems/transformation**